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ABSTRACT

A flood of new electronic technologies promises to usher in the Information Age and alter economic and social structures. Telematics, a potent combination of telecommunications and computer technologies, could eventually bring huge volumes of information to great numbers of people by making large data bases accessible to computer terminals in homes, offices, banks, post offices, government agencies, and other places. Communications between computers and data banks will be greatly enhanced through satellites, creating world-wide telematics networks. As these new electronic technologies grow, they will begin competing with one another for a "slice of the media pie." Cable television systems bring a wide array of information into the home, including signals from distant cities, pay television movies, and electronic publishing services. The variety of new communication channels will be accessible to and provide specialized programming for minorities and other individual groups. Although such "narrowcasting" is likely to fragment the public, providing little overlap in the interests or acquired information of individuals, such fragmentation will benefit advertisers, as well as allow businesses to reach specific groups of consumers through channels other than advertising. Already, smaller, more tightly targeted magazines are eroding the markets of previously mass circulating magazines. (HTH)

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NEW TECHNOLOGY AND INFORMATION EXPLOSION

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TO THE EDUCATIONAL RESOURCES
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This report was written by David Johns, a Master's can-
didate at the University of Missouri School of Journalism.

A flood of new electronic technologies promises to usher in the Information Age, which could alter the very economic structure of society and, in the process, create a new civilization. In recent years, the U.S. economy has begun what some are calling an inevitable drift away from heavy steel-based industries toward information-related technologies based on wires, chips and electromagnetic waves. Several of the new technologies rely on communications satellites, which orbit 22,300 miles above the earth, transmitting continuous radio signals that blanket an area covering one-third of the globe. The multi-channel transmitting capability of cable TV and the relatively small capital expenditures required to set up low power TV stations could make the airwaves more accessible to minorities and women. Instead of broadcasting messages to mass audiences, the new technologies will "narrowcast" programming to targeted groups.

THE THIRD WAVE ROLLS IN

The well-known futurist and author Alvin Toffler has described the Information Age as part of a larger movement, which he calls "The Third Wave." In his most recent book, *The Third Wave*¹, he described the new era the American society is entering and painted an optimistic scenario of the future. The great advancements mankind has made throughout history can be viewed as waves of change that sweep over the traditional ways of life, revolutionizing them. The society is now in a painful and often confusing transition between the Second and Third Waves, according to Toffler:

A new civilization is emerging in our lives, and blind men everywhere are trying to suppress it. This new civilization brings with it new family styles; changed ways of working, loving, and living; a new economy; new political conflicts; and beyond all this an altered consciousness as well. Pieces of this new civilization exist today. Millions are already attuning their lives to the rhythms of tomorrow.²

The First Wave, agriculture, began about 8000 B.C. and lasted until about A.D. 1700. The industrial revolution ushered in the Second Wave, which is now beginning to subside as the Third Wave moves in. The first era lasted thousands of years, the second age lasted only about 300 years, and the Third Wave probably will last only a few decades if the rate of change continues to increase.³

The transition from the "primitive" way of life based on hunting, fishing and gathering to the First Wave was slow and incomplete compared to the transition from the First Wave to the Second Wave. The agricultural revolution passed over large groups of people who continued to live in the past. When the Second Wave began, the world had become a much smaller place in a sense because of developments in transoceanic travel and colonialism. Few would deny that the industrial revolution has had a profound impact on the lives of everyone with the exception of a few people living in isolated pockets of the world. In Toffler's view, industrialization was more than factories and assembly lines. He explained:

It was a rich, many-sided social system that touched every aspect of human life and attacked every feature of the First Wave past. It produced

Summary:

The advent of new technologies, based on wire chips and electromagnetic waves, promises to usher in the Information Age which could alter the economic structure of the American Society. Instead of broadcasting messages to mass audiences, the new technologies, relying mainly on satellite communications, will "narrowcast" programming to targeted groups.

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the great Willow Run factory outside Detroit, but it also put the tractor on the farm, the typewriter in the office, the refrigerator in the kitchen. It produced the daily newspaper and the cinema, the subway and the DC-3. It gave us cubism and twelve-tone music. It gave us Bauhaus buildings and Barcelona chairs, sit-down strikes, vitamin pills, and lengthened life spans.⁴

The rumblings of the Third Wave began about 1955 with the rise of jet travel, computers and white-collar workers. Its impact will be more profound than that of the Second Wave, according to Toffler. A comparison between the sagging steel industry in Pittsburgh and the booming computer components business in California's "Silicon Valley" provides a striking example of the painful transition from a dying Second Wave to an emerging Third Wave society.

Industrial change is only one aspect of the Third Wave that Toffler wrote about. In addition to a new "techno-sphere," which is the term he used to describe the industrial-economic changes the society is experiencing, he wrote about a new "sociosphere," "info-sphere," "power-sphere" and "psycho-sphere."⁵ All six elements of the Third Wave are, of course, interrelated. This paper will examine only the "techno-sphere" and "info-sphere" because they relate most closely to the subject under examination.

As new forms of energy are developed, and as new technologies emerge, the need for fossil fuels will become obsolete, according to Toffler. In the past 50 years, two-thirds of the world's energy supply has come from dwindling reserves of oil and gas, which pollute the air.⁶ The burning of coal causes acid rain, and the mining of it scars the earth. Nuclear reactors will not be able in the future, Toffler continued, because of high cost, waste disposal problems, safety hazards and the scarcity of uranium. In the Third Wave, society will develop clean, renewable sources of energy such as photovoltaic cells that convert sunlight into electricity, windmill-carrying balloons in the tropopause and garbage, coconut waste, geothermal and solar heat.⁷ Toffler described the use of energy in the future Third Wave society:

Instead of being dependent upon highly concentrated fuels, it will draw on a variety of widely dispersed sources. Instead of depending so heavily on tightly centralized technologies, it will combine both centralized and decentralized energy production. And instead of being dangerously over-reliant on a handful of methods or sources, it will be radically diversified in form. This very diversity will make for less waste by allowing us to match the types and quality of energy produced to the increasingly varied needs.⁸

Third Wave technologies will require much less energy than the heavy industries of the Second Wave.⁹ The industries of the future will involve computers, satellites, sophisticated petro-chemicals, semi-conductors and advanced communications. The electronics industry grosses more than \$100 billion a year and is expected to pass \$325 billion by the end of the decade.¹⁰ Only a hermit would be unaware of the explosive impact of the computer industry, which has recently made inroads into millions of U.S. homes and businesses.

Another vital part of the emerging "techno-sphere" is the aerospace industry. Several companies are planning space

platforms for scientific experimentation and communications. As NASA's space shuttle becomes more and more commercially viable, it will be used increasingly for medical and high-technology experimentation. The lack of gravity in space would provide an ideal environment for the production of Urokinase, a blood clot dissolver, and for certain materials used in lasers and fiber optics. Dr. Gerald O'Neill, a Princeton University physicist, has planned cities in space to be populated by thousands.¹¹

In Toffler's view, the Third Wave will revolutionize industry:

The combination of advanced electronics and a space program that moves beyond terrestrial production possibilities carries the technosphere to a new stage, no longer limited by the Second Wave considerations.¹²

An outgrowth of the new "techno-sphere" is the emerging "info-sphere" or "intelligent environment." In the agricultural era, the human brain was the predominant means of recording events and instructions. Information was constantly eroding and combining with new information. With the advent of the printed word in the industrial age, information was objectified and frozen. As the Third Wave moves in, we have the capability of not only storing information, but processing it through the use of computers. According to Toffler, the impact of the computer will be tremendous:

It makes possible a flood of new theories, ideas, ideologies, artistic insights, technical advances, economic and political innovations that were, in the most literal sense, unthinkable and unimaginable before now. In this way, it accelerates historic change and fuels the thrust toward Third Wave social diversity.¹³

Computers are rapidly becoming omnipresent. Microprocessors connected through telecommunications systems to central computers could be embedded in everything from air-conditioners and sewing machines to coffee makers. Alan P. Hald, a leading microcomputer distributor, suggested an amusing scenario involving computers:

Imagine. You're at work, the phone rings. It's Fred, your house. While monitoring the morning news report for stories of recent burglaries, Fred picked up a weather bulletin warning of pending heavy rain. This jogged Fred's bubble memories to run a routine roof maintenance check. A potential leak was found. Before calling you, Fred phoned Slim for advice. Slim is a ranch-style home down the block.¹⁴

THE EMERGENCE OF TELEMATICS

Computer-to-computer communication is becoming more and more widespread as a result of "telematics," a term coined by Simon Nora and Alain Minc in their book, *The Computerization of Society*.¹⁵ Telematics is the potent combination of telecommunications and computer technologies that could eventually bring huge volumes of information to great numbers of people. Through advanced telecommunications networks, large data bases can be made accessible

to computer terminals in homes, offices, banks, post offices, government agencies, etc. The authors explained:

The possibility of meeting the needs of a large number of users at affordable prices makes the universe of the computer almost limitless. Instead of remaining the prerogative of a few large, powerful firms, it is opening its doors to hundreds of thousands of potential users, to small and mid-size businesses, the professions, and even homes, whose capacity for dialogue, demands, and financial resources call for a diversified approach.¹⁶

Computer technology has advanced at an incredible rate in recent years. Today's computers are smaller, less expensive and much more powerful than their bulky counterparts of the 1950s.¹⁷ The first computers were complex, fragile, difficult to repair and accessible only in machine language. Only a few data technicians were able to communicate with them through esoteric languages.

The introduction of integrated circuits in 1965 significantly increased the reliability and decreased the size of computers. Simpler languages such as "COBOL," "FORTRAN" and "PL 1" made computers more accessible and easier to program. Computer users could spend less time programming and more time analyzing data. A microprocessor today with a width of only a few millimeters has the same processing ability as a room-size computer built 20 years ago.¹⁸ Because electronic components have made computers smaller and less expensive, they are no longer limited to business use. More and more computers are being utilized in the home for a wide variety of purposes. Nora and Minc would agree with Toffler that the computer will eventually become an integral part of our daily lives.

Communications between computers and data banks will be enhanced greatly through satellites, which will help create a world-wide "telematics" network. Computers in different countries and on opposite sides of the globe will transfer data back and forth instantaneously and relatively inexpensively. According to Nora and Minc, communications satellites will be: 1) "powerful transmitters" capable of conveying millions of bits per second, 2) "universal transmitters" that will send all kinds of data, including voice, television and digital information, 3) "easily accessible transmitters" (receiving antennae will be less than 1.5 meters in size and much more affordable than today's earth dishes), and 4) "transmitters of limitless scope" that, unlike terrestrial telecommunications systems, will not be restrained by terrain or geography.¹⁹

Nora and Minc compared the expanding computer networks to the electrical networks connecting power plants to other power plants and homes. Computer users now can call up information instantaneously at the push of a button or flip of a switch.²⁰ The future "telematics" networks will be two-directional systems that "theoretically" could connect any two computers in the world. According to Nora Minc, a world-wide computer network will expand systematically. Computers first will communicate with one another within clusters and eventually clusters will communicate with other computer clusters.

A Japanese author, Yoneji Masuda, views the emergence of "telematics" with optimism. In his book, *The Information Society*, he wrote:

Man is now standing at the threshold of a period of innovation in a new societal technology based on the combination of computer and communications technology. This is a completely new type of societal technology, quite unlike any of the past. Its substance is information, which is invisible.²¹

The new era, which is in the planning stages in Japan, will shift the emphasis of society from materialism to intellectualism. Masuda explained:

The goal of the plan is the realization of a society that brings about a general flourishing state of human intellectual creativity, instead of affluent material consumption... If the goal of industrial society is represented by volume consumption of durable goods or realization of heavy mass consumption centering around motorization, information society may be termed as a society with highly intellectual creativity where people may draw future designs on an invisible canvas and pursue and realize individual lives worth living.²²

ALPHABET SOUP: THE PROLIFERATION OF CHANNELS

The Information Age could be described as a time of unprecedented growth in new channels of communication that are greatly expanding the ability of people to send, receive and store information. An explosion of new technologies is making it possible to bring huge volumes of information and entertainment into the homes of millions of Americans. Less Brown, editor-in-chief of *Channels of Communications* magazine, described the information explosion:

...the electronic environment surrounds us every minute of our lives. For these wires, chips, and radio waves combine in a profusion of new media, some of which by now have entangled themselves inextricably with business, education, politics, law, and our popular culture. Indeed, this electronic wonderland already makes a greater claim than the natural environment on the attention of children.²³

As the multitude of new electronic technologies grows, they will be competing with one another for a slice of the media pie. Some of the new media such as cable TV have already established themselves in the marketplace and are trying to become profitable. Others such as DBS are still on the drawing boards. The ability of all the new media to survive is uncertain considering the high capital expenditures required to set up operations and limited amount of advertising revenue and leisure time that exists.

SATELLITE-RELATED TECHNOLOGIES

Cable TV systems can bring a wide array of information into the home, including television signals from distant cities, pay TV movies and electronic publishing services. Cable systems are excellent two-way media for interactive services such as information retrieval, electronic shopping and banking, smoke detection and burglar alarm systems, electronic mail and videoconferencing. Nicholas Johnson, a former FCC member, said that "the difference between or-

dinary television and cable is the difference between a garden hose and Niagara Falls.²⁴

Although cable TV has been around for several decades, its emergence into a major medium of communication is a recent phenomenon. Community Antenna Television (CATV) began in the late 1940s in rural areas, where regular television reception was poor. After an antenna was placed in a high location, wires were strung to houses below. Signals from nearby cities were picked up by the antenna and distributed to the participating homes. The early CATV systems were capable of transmitting only three stations—one channel for each network.²⁵

The new medium continued to grow in the 1950s as towns already receiving one or more regular over-the-air stations began to import additional signals from nearby cable TV systems. Its growth was further enhanced by technological innovations. The development of a converter in the 1960s increased the capacity of CATV systems to 20 channels. The converter allowed cable systems to originate as well as retransmit programming. The number of cable TV systems doubled between 1961 and 1965.²⁶

Cable TV was launched into the limelight through satellite technology in 1975. Home Box Office (HBO), a pay movie service, became a national hit soon after leasing a transponder on the Satcom I satellite. A profusion of other cable TV networks flocked to the satellite, which gave them national coverage at relatively low cost. Local CATV operations gained national exposure through satellite technology.²⁷

Cable TV systems now receive satellite-transmitted programming at headends, which are equipped with one or more earth stations. Conventional antennas at the headends pick up radio and television signals. The various signals are retransmitted from the headend to subscribers' homes through coaxial cable. In some of the larger cable TV systems, signals are first microwaved from the headend to surrounding hubs, then retransmitted to homes.²⁸

By 1980, every city in the United States was either wired for cable TV or in the process of negotiating a franchise. According to the A.C. Nielson Company, 34 percent of U.S. homes were subscribing to cable TV in mid-1982.²⁹ The channel-carrying capacities of different cities vary according to when they were built. Some of the systems now under construction provide 52 channels on a single cable line and 104 channels on a double line.³⁰ The flood of cable TV program services that has emerged since the rise of HBO in 1975 is posing a serious challenge to the three networks. The number of program services transmitted via satellite and ultimately through cable systems has grown to about 40, and about 30 more are on the drawing boards.³¹

Projections about the future growth of cable TV vary. Thomas E. Wheeler, president of the National Cable Television Association, predicted 40 percent penetration by 1985 and 50 million (more than 50 percent) by 1990.³² According to John F. Budd Jr., vice president-external relations for Emhart Corp., cable TV will reach 55 million homes by 1990.³³ An even more optimistic forecast was made by John R. Werner, director of research and development for The New York Times, who predicted 57.8 million cable TV subscribers (61 percent) by 1990.³⁴

Another technology that is expanding the realm of home

entertainment is pay TV. Most of the 14 million pay TV customers in the United States receive the service through cable systems, but it can also be distributed over the air or through Satellite Master Antenna Television (SMATV) and Direct Broadcast Satellite (DBS). Subscribers pay about \$10 a month for decoders attached to their television sets that descramble the pay TV signals. Most of the pay TV services offer movies. The leaders are HBO, Cinemax, Showtime, The Movie Channel and The Entertainment Channel.³⁵

Pay TV and other cable-related services can be transmitted to housing complexes through SMATV systems. The owners of apartments, condominiums, mobile home parks, hotels and motels can set up their own mini-cable systems. All they need is an earth station pointed toward the appropriate satellite and cable leading to the residents' homes. Unlike cable TV, SMATV does not require city franchises because the wires connecting the earth stations to subscribers' homes run through privately owned property. Cable TV owners must work out franchises with city governments because their wires pass through public property.³⁶ In December 1982, there were about 500,000 SMATV subscribers in the United States.³⁷

The high cost involved in the stringing of wire for cable TV and SMATV services is eliminated in DBS systems. About 30,000 home owners have installed receiving dishes in their backyards that enable them to receive cable TV and other satellite-transmitted signals free of charge.³⁸ The legality of pirating cable TV signals is not yet clear, however. The general price range for a backyard receiving station is from \$3,000 to \$10,000.³⁹

A more respectable form of DBS was approved by the FCC in June 1982.⁴⁰ The Commission set up interim rules for the licensing and operation of commercial DBS systems. The specially designed DBS satellites will operate in the 12-gigahertz band.⁴¹ The large DBS birds will deliver high-powered (200-400 watts per transponder, compared to conventional 5- or 6-watt transponders) beams to small (2½-foot in diameter) earth dishes owned by DBS subscribers across the country.⁴² Unlike most modern satellites, which carry 24 transponders, the powerful DBS birds will have only three transponders on board.⁴³

The FCC-approved DBS systems will provide paying customers with programming arranged specifically for DBS instead of pirating signals from cable TV operations. The most likely DBS customers will be people living in rural areas and cities not wired for cable TV. As many as 30 channels of movies, teletext, sports, sound tracks and more can be transmitted through scrambled signals, which subscribers will unscramble with special decoders. The use of the 12-gigahertz band by DBS operators will make possible television reception of exceptionally high quality.⁴⁴

The ability of DBS to survive in the fiercely competitive arena of electronic communications is less than certain. Analysts generally agree that the DBS market can only support two or three operations.⁴⁵ In its 1982 decision, the FCC approved eight of 13 DBS applications.⁴⁶

Satellite Television Corp. (STC), a subsidiary of the Communications Satellite Corp. (Comsat), was the first applicant and fore runner in the DBS competition. STC plans to begin offering three DBS channels for movies, concerts, sports, public affairs, education and children's program-

ning in the mid-1980s. Under its plan, subscribers would pay \$100 for a 2½-foot dish, \$18 per month for programming and \$10 a month to lease electronic gear.⁴⁷

NON-SATELLITE TECHNOLOGIES

Personal computers have become a symbol of the Information Age. They can perform a multitude of tasks including word processing, data processing, information storage and retrieval and, of course, video game programming. The cassette tapes and floppy disks used for memory in personal computers can store recipes and poems and keep track of energy use. Computers are an integral part of the videotext systems through which users can access tremendous volumes of information stored in central data banks.⁴⁸

An estimated four million U.S. households now have personal computers.⁴⁹ *Newsweek* magazine has projected 50 million computer-equipped homes by 1985—a figure John Werner, director of research and development for *The New York Times*, called overoptimistic.⁵⁰ Apple Computer Co., the first firm to market personal computers on a mass scale, has already broken into the Fortune 500. IBM and several other firms have also entered the lucrative field of home computers.⁵¹

High-speed computer data as well as television, radio and telephone signals can be transmitted digitally through a powerful new medium called fiber optics. In a fiber optics system, electrical signals are converted from analogue to digital form. Flashes of light are channelled through flexible threads of glass, which reflect the light until it reaches the other end. After the binary signals reach the end of the fiber, they are reconverted into electrical signals.⁵²

Fiber optics systems have many advantages over conventional telephone lines. The transmitting capacity of fiber optic strands is much greater than that of copper wires. The Nippon Electric Co. of Japan estimated that a single optical fiber can carry 50 million simultaneous telephone calls. A pair of copper wires by comparison can handle only 32 conversations.⁵³

Laser signals passing through the core of a fiber fade less rapidly than electrical signals moving through copper wires, which require signal repeaters every two kilometers. In fiber systems, repeaters can be spaced 10 to 20 kilometers apart.⁵⁴ Fiber optic strands can be made from silicon, which is much less expensive than copper. The glass strands are lightweight and flexible. A 500-meter fiber weighs 25 kilograms compared to five metric tons for a coaxial cable of the same length.⁵⁵

Fiber optics technology grew out of laser research in the late 1950s and early 1960s. Scientists found glass fibers to be an excellent medium for carrying laser beams. In the 1970s, they were installed in airplanes because of their light weight. In 1981, the British laid a fiber optics cable under the North Sea.⁵⁶ AT&T recently announced plans for a 983-kilometer fiber optics telephone network linking Washington, D.C., Philadelphia, New York and Boston. On the West Coast, Ma Bell plan to install a 966-kilometer fiber optics line between Los Angeles and Sacramento.⁵⁷

Another emerging laser technology is the optical video disc. Its prototype, the Movie Map disc, was created by the

Massachusetts Institute of Technology in 1977. Each side contains 54,000 frames of audio and visual information from the streets of Aspen, Colorado. Through a method known as random access, a viewer can summon information from the disc almost instantly. In less than one-thirtieth of a second, a low-power laser beam scans billions of microscopic pits into the disc until it reaches the requested frame.⁵⁸

James Traub, a writer for *Channels of Communications* magazine, described the unique experience of using the Movie Map disc:

Sitting before a screen, you are driving yourself down the main street of Aspen, Colorado. At the first intersection, you touch an arrow on the left side of the screen—and make a left turn onto another street. Midway down the block you come upon a handsome old hotel, stop to examine the architecture, touch the building—and you are inside. Once there you can hear a history of the building by touching it again. And then you can return to your drive, touring Aspen in any order you wish, turning right or left at any crossing.⁵⁹

One of the advantages of optical video discs over conventional phonographic records and magnetic tapes is permanence. Placed in a disc player, the 12-inch plastic-coated discs spin at 1,800 revolutions per minute. A laser reads the encoded data without actually touching the disc so it never wears out like a record or tape.⁶⁰

The ability of the laser disc to store large volumes of information could have tremendous applications in the fields of medicine and education. Programs designed for different levels of learning could be recorded onto discs. The entire *Encyclopedia Britannica* could be stored on a few discs. Hospitals could keep medical records including X-rays on discs. Laser discs can provide high fidelity stereophonic music, sharply focused movies and still photographs.⁶¹

A less awesome but more flexible information storage technology is the video cassette recorder (VCR), which has been around since the mid-1970s. An estimated 4.5 million homes (about 4 percent of TV homes) in the United States now have VCR's.⁶² Unlike the laser disc player, the VCR can record material in the home. The primary use of VCR's has been to record TV programs while the owners are away or asleep.⁶³ ABC and Sony recently established the Home View Network (HVN), which will transmit pay TV programming to an audience of VCR's in the early hours of the morning. The network will send scrambled signals to subscribers while its affiliated stations are off the air.⁶⁴

The taping of home movies with video cameras and VCR's has become an attractive alternative to film. Home movies require no development and can be seen instantly. Most of the preprogrammed cassettes used by VCR owners contain the same movies that appear on pay TV systems.⁶⁵

Another broadcasting medium known as Low Power Television (LPTV) could give minorities, women and small-town citizens greater access to the airwaves. LPTV systems are designed to send signals only 15 to 25 miles in any direction using the VHF and UHF bands.⁶⁶ VHF stations operate on only 10 watts, and UHF stations broadcast with 1,000 watts of power. Standard broadcast channels operate on as

many as five million watts.⁶⁷ Interference with other stations transmitting on the same frequency is less of a problem with LPTV stations because of their small broadcasting radii.

The relatively low capital expenditure (about \$50,000 for VHF's and \$80,000 for UHF's) needed to establish an LPTV station makes it an ideal medium for groups that cannot afford to set up standard broadcasting stations.⁶⁸ In its review of LPTV applications, the FCC has given priority to minorities, people living in rural areas and small-businessmen. Several corporations including ABC, NBC, Turner Broadcasting and the Gannett newspaper chain have filed for licenses, however. The FCC eventually will grant licenses to about 4,000 of the 6,593 LPTV applications.⁶⁹ The first LPTV station was established in December 1981 by a retired broadcasting executive in Bemidji, Minnesota.⁷⁰

Multiple Distribution Service (MDS) systems also operate within 25-mile radii, but their frequency ranges are much higher than those used in LPTV. In order to receive the super-high frequency signals (2,150 to 2,160 megahertz), viewers must attach a down converter to their antennas. The concave receiving antennas must be in line-of-sight with the broadcasting station because buildings and hills interfere with reception.⁷¹

Pay TV services such as HBO and Showtime use MDS to reach potential subscribers without going through cable TV channels. Most of its estimated 750,000 customers are hotel and apartment owners, who charge guests and tenants for the service. Its greatest success has been in areas not yet wired for cable TV.⁷²

Another broadcast medium called Subscription Television (STV) is rivalling MDS and pay TV in the transmission of movies to the home. STV signals are scrambled to ensure that only paying subscribers equipped with decoders receive the programming.⁷³ Most STV services are broadcast over a single UHF station.⁷⁴ Through a technique known as addressability, STV companies can turn decoders on or off by sending special codes to individual boxes. Using addressability, a non-paying subscriber can be disconnected. In addition to recently released movies, STV systems broadcast sports events and special programming such as 3-D films.⁷⁵

The first STV experiments in the late 1940s and early 1950s suffered from technical problems. An STV trial set up by Zenith in 1951 using phone lines folded after people began breaking into the system and viewing movies free-of-charge. A coin-operated system used by Paramount in Palm Springs proved to be faulty. Another Paramount project set up in Esbicoke, Canada, in 1960 was more successful. In the 1960s, the FCC established rules inhibiting the growth of STV. Several STV stations in large cities came into existence in 1982 following deregulation by the FCC.⁷⁶ More than one million households in the United States now subscribe to STV services.⁷⁷

Special events like prizefights can be transmitted for a price through STV, MDS, SMATV and cable TV systems using a new technology called pay-per-view. Customers buy a "disposable trap" which is attached to the TV set and thrown away as soon as the concert, play, movie or sports event is over. The price of the disposable decoders varies depending on the event, but most cost about \$10. In the future, pay-per-view billings may be done automatically through interactive cable TV systems. The advertising firm of Ogilvy & Mather estimated that half of all the homes in this country will be equipped to receive pay-per-view events

by 1990. About two million households now have pay-per-view capability.⁷⁸

FROM BROADCASTING TO NARROWCASTING

The flood of new communication channels saturating U.S. society at an unprecedented rate has changed the very nature of broadcasting. For decades, the three networks monopolized television programming. NBC, CBS and ABC offered television viewers a limited number of channels (three) from which to choose. With the proliferation of new media, the choices are being multiplied exponentially, it seems, and the traditional turf of the networks is being seriously challenged.

Instead of the conventional broadcasting fare aimed at the general public, the new media can provide specialized programming directed toward individual groups. The traditional media broadcast messages to a large mass audience. The new media are narrowcasting various forms of entertainment and information to specialized audiences. Cable TV viewers, for example, can choose from a wide variety of programs including Gilligan's Island reruns, 24-hour news, stock market information and the latest in aerobic exercise.

In *The Third Wave*, Toffler referred to the phenomenon of narrowcasting as "demassification of the media."⁷⁹ He added:

The diversity of offerings has also sharply increased, with different stations appealing to specialized audience segments instead of to the hitherto undifferentiated mass audience. All-news stations aim at educated middle-class adults. Hard rock, soft rock, country rock, and folk rock stations each aim at a different sector of the youth audience. Soul music stations aim at Black Americans. Classical music stations cater to upper-income adults, foreign language stations to different ethnic groups, from the Portuguese in New England to Italians, Hispanics, Japanese, and Jews.⁸⁰

Narrowcasters are fragmenting the public, according to Roy Fisher, former dean of the University of Missouri School of Journalism. He explained:

The individual will develop a few very favorite channels, and he will make those his primary sources of information. Those channels will reflect his biases and personal interests, for example, sports. If he gets his news outside of sports, he'll turn to something that pleases his particular level of sophistication and interest. But his neighbor may very well be overlapping very little with his interest or his sources of information.⁸¹

The fragmentation of audiences will benefit advertisers, according to Paul Mc Pherson, president of McGraw-Hill Publications Co. He elaborated:

Advertisers will be able to target their messages with a degree of selectivity and accuracy never thought possible, resulting in increased productivity. Computer technology promises to hold down printing and distribution costs, thereby restraining the rise of advertising and subscription costs. Editorially our opportunity to truly identify and ex-

plain the issues facing our world will be limited only by our ability to comprehend those issues.⁸²

The new media will allow businesses to reach specific groups of consumers through channels other than advertising. Television commercials are only one way businesses will be able to reach specific groups of consumers. The new media are making it possible for various entities such as businesses and political organizations not only to receive specific information but to distribute information to targeted audiences. John F. Budd, Jr., vice president-external relations for Emhart Corp., explained how demassification of the media will affect the business community:

It means that corporations will have an effective alternative to the wire services, the networks and the big circulation businesses and news weeklies in reaching those publics whose support, interest and understanding they want and need. It means that they can do this as news and as information, not as advertising. It means that the persuasive power of television...its immediacy and its credibility...is no longer of limited access to business and businessmen. And it means that business can have the reach and audience for its communications of a quality and specific dimension superior to the mass media's necessarily more homogenized servings.⁸³

According to D. Mel Tinney, manager of Cable Publishing

Ventures, the new electronic environment is shifting power from the media to the viewing public. In a recent speech, he said:

We are entering a period where the receiver, not the sender, decides what information is to pass through a channel of communication. This decision has traditionally been made by editors and news directors and has represented a significant base of power.⁸⁴

Broadcasting is not the only medium that is becoming demassified. The great influence of mass circulation magazines such as *Life*, *Look* and the *Saturday Evening Post* on public opinion is being eroded by an explosion of mini-magazines. Almost any community group or organization can print a publication using cheap, short-run printing presses or copying machines.⁸⁵ Toffler wrote about the specialized nature of today's magazine:

Pilots and aviation buffs today can choose among literally scores of periodicals edited just for them. Teen-agers, scuba divers, retired people, women athletes, collectors of antique cameras, tennis nuts, skiers, and skateboarders each have their own press. Regional magazines like *New York, New West*, *D* in Dallas, or *Pittsburgher*, are all multiplying. Some slice the market up even more finely by both region and special interest—the *Kentucky Business Ledger*, for example, or *Western Farmer*.⁸⁶

FOOTNOTES

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